CAMOSUN COLLEGE	**School of Arts & Science** **MATHEMATICS DEPARTMENT** **MATH 254** **Probability and Statistics** **Quarter 2**

COURSE OUTLINE

1. Instructor Information

(a)	Instructor:	Gilles Cazelais	
(b)	Office Hours:	http://pages.pacificcoast.net/~cazelais/schedule.html	
(c)	Location:	CBA 158 (Interurban)	
(d)	Phone:	370-4495	Alternative Phone:
(e)	Email:	Cazelais@camosun.bc.ca	
(f)	Website:	http://pages.pacificcoast.net/~cazelais/254.html	

2. Intended Learning Outcomes
(No changes are to be made to these Intended Learning Outcomes as approved by the Education Council of Camosun College.)

Upon completion of this course the student will be able to:

1. Use techniques from combinatorics to solve counting problems. Calculate probabilities using simple events, counting techniques, and the axioms and properties of probability and conditional probability. Define and identify independent events, mutually exclusive events, and complements. Calculate probabilities using Bayes' theorem.
2. Describe a discrete data set graphically via a stem-and-leaf display, histogram, relative frequency polygon, and box plot.
3. Describe a discrete data set numerically by calculating the mean, mode, median, sample and population variance, and sample and population standard deviation. Make predictions about the distribution of a data set using the Empirical Rule and Tchebyshev's Theorem.
4. Perform calculations and solve problems involving probability distributions of discrete random variables, including binomial, Poisson, hypergeometric, and negative binomial distributions. Calculate the expected value of a random variable. Perform calculations involving probability distributions of continuous random variables, including normal and gamma distributions. Use the Standard Normal Table to solve problems involving normal distributions.
5. Describe and identify sampling plans. Calculate sampling distributions for sample mean and sample proportion. Interpret control charts for sample mean and proportion.
6. For large samples, calculate point estimates and confidence intervals for population means and proportions. Perform large-sample tests of hypothesis for population means and differences in means and for population proportions and differences in proportions.
7. For small samples, use the student's t distribution to calculate point estimates and confidence intervals and for hypothesis testing. For small samples, use the chi-square probability distribution to construct confidence intervals and perform hypothesis testing on the population variance.
8. For a bivariate data set, determine the regression (least squares) line, and calculate and interpret the coefficients of correlation and determination. Use least squares to fit quadratic, cubic, and exponential curves to a given bivariate data set.

3. Required Materials

Introduction to Probability and Statistics, Preliminary Canadian Edition (2009) by Mendenhall, Beaver, Beaver, and Ahmed.

4. Course Content and Schedule

See: http://pages.pacificcoast.net/~cazelais/schedule.html

5. Basis of Student Assessment (Weighting)

_ Two term tests: 40%
_ Homework Assignments : 10%
_ Comprehensive _nal exam: 50%

6. Grading System

(No changes are to be made to this section unless the Approved Course Description has been forwarded through the Education Council of Camosun College for approval.)

Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D	Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite.	1
0-49	F	Minimum level has not been achieved.	0

Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy E-1.5 at **camosun.ca** for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	*Incomplete*: A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	*In progress*: A temporary grade assigned for courses that, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. *(For these courses a final grade will be assigned to either the 3rd course attempt or at the point of course completion.)*
CW	*Compulsory Withdrawal:* A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.

7. Recommended Materials or Services to Assist Students to Succeed Throughout the Course

LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning.
This information is available in the College calendar, at Student Services, or the College web site at
camosun.ca.

STUDENT CONDUCT POLICY

There is a Student Conduct Policy **which includes plagiarism**.
It is the student's responsibility to become familiar with the content of this policy.
The policy is available in each School Administration Office, at Student Services,
and the College web site in the Policy Section.

Topics covered from the book.

1. Describing Data with Graphs
_ Variables and Data (1.1)
_ Types of Variables (1.2)

_ Graphs for Categorical Data (1.3)
_ Graphs for Quantitative Data (1.4)
_ Relative Frequency Histogram (1.5)

2. Describing Data with Numerical Measures
_ Describing a Set of Data with Numerical Measures (2.1)
_ Measures of Center (2.2)
_ Measures of Variability (2.3)
_ On the Practical Signi_cance of the Standard Deviation (2.4)
_ A Check on the Calculation of s (2.5)
_ Measures of Relative Standing (2.6)
_ Box Plot (2.7)

3. Probability and Probability Distributions
_ The Role of Probability in Statistics (4.1)
_ Events and Sample Space (4.2)
_ Calculating Probabilities Using Simple Events (4.3)
_ Useful Counting Rules (4.4)
_ Event Relations and Probability Rules(4.5)
_ Conditional Probability and Independence (4.6)
_ Bayes' Rule (4.7)
_ Discrete Random Variables and Their Probability Distributions (4.8)

4. Several Useful Discrete Distributions
_ Introduction (5.1)
_ The Binomial Probability Distribution (5.2)
_ The Poisson Probability Distributions (5.3)
_ The Hypergeometric Probability Distribution (5.4)

5. The Normal Probability Distribution
_ Probability Distributions for Continuous Random Variables (6.1)
_ The Normal Probability Distribution (6.2)
_ Tabulated Areas of the Normal Probability Distribution (6.3)
_ The Normal Approximation to the Binomial Probability Distribution (6.4)

6. Sampling Distribution
_ Sampling Plans, Statistics and Sampling Distributions (7.1 - 7.3)
_ The Central Limit Theorem (7.4)
_ The Sampling Distribution of the Sample Mean (7.5)
_ The Sampling Distribution of the Sample Proportion (7.6)

7. Large-Sample Estimation
_ Point Estimation (8.1 - 8.4)
_ Interval Estimation (8.5)
_ Estimating the Di_erence Between Two Population Means (8.6)
_ Estimating the Di_erence Between Two Binomial Proportions (8.7)
_ One-Sided Con_dence Bounds (8.8)
_ Choosing the Sample Size (8.9)

8. Large-Sample Tests of Hypotheses
_ A Statistical Test of Hypothesis (9.1 - 9.2)
_ A Large-Sample Test About a Population Mean, p-value (9.3)
_ A Large-Sample Test of Hypothesis for the Di_erence Between Two Population Means (9.4)
_ A Large-Sample Test of Hypothesis for a Binomial Proportion (9.5)
_ A Large-Sample Test of Hypothesis for the Di_erence Between Two Binomial Proportions (9.6)

9. Inference from Small Samples
_ Student's t Distribution, Small-Sample Inferences of a Population Mean (10.1-10.3)
_ Small-Sample Inferences for the Di_erence Between Two Population Means (10.4)
_ A Paired-Di_erence Test (10.5)
_ Inferences Concerning a Population Variance (10.6)

10. Linear Regression and Correlation
_ The Method of Least Squares (12.1 - 12.3)
_ Correlation Analysis (12.8)

11. Analysis of Categorical Data
_ Chi-Square Statistic and Testing Speci_ed Cell Probabilities (14.1 - 14.3)
_ Contingency Tables (14.4 - 14.5)